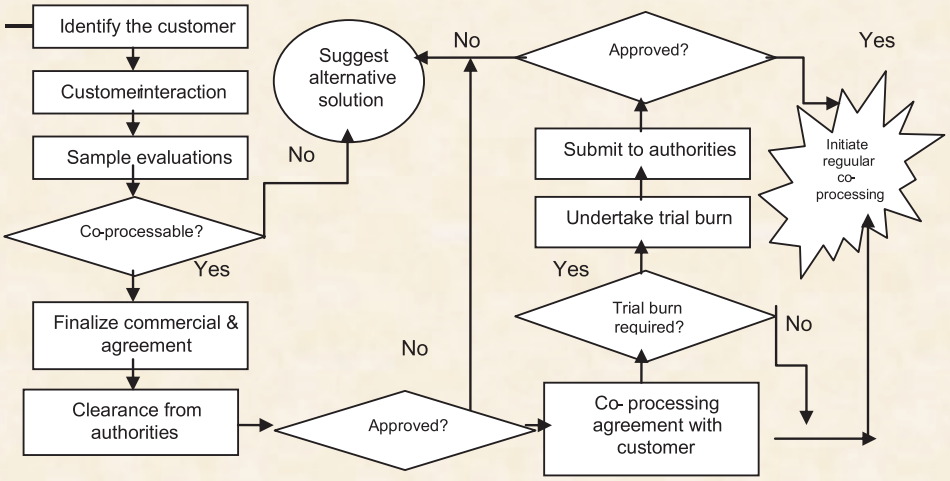
Intervening Technology/ Technique	**Co-processing of Hazardous and Non Hazardous Wastes as Alternate Fuel in Cement Kiln.**

About the industry	M/s. Ambuja cement is the largest cement manufacturing company located in Ambujanagar, Gujarat. Company engaged in manufacturing of **Portland Pozzolana Cement (PPC) using fly ash, Ambuja PLUS,** high quality cement with a promise of "more strength".
Implemented Techniques/ Technology	**Before** ● Gujarat, Maharashtra and Andhra Pradesh are the top three Hazardous Waste generating states in India. The relative contributions by these States are 28.76 %, 25.16 % and 8.93 % respectively. In Gujarat state, the management and disposal of waste polythene bags and other non-recyclable polythene/plastic wastes was a serious problem for local bodies like municipalities and corporations. **After** ● With a proactive approach for this problem, Gujarat Pollution board (GPCB) has come forward and encouraged the cement industries in the state, for utilizing these plastic and polythene wastes as co-fuel in the cement kilns. ● High temperature in the cement kiln ensures the proper combustion, dissociation and disposal of wastes in an environment friendly manner as its heat value can be utilized for the cement manufacturing process.  AFR facility at Ambuja Cement Limited, Ambujanagar: ● System for Co-processing of Solid waste ● System for Co-processing Liquid waste

System for Co-processing of Solid waste

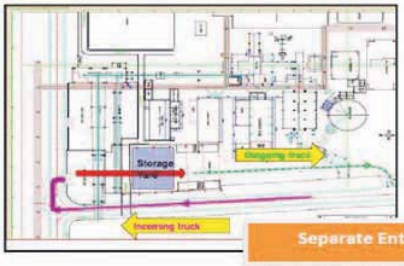
Pre-processing of Solid Waste:

Industry is using following methods to prepare the best quality waste acceptable to their Cement Kilns at Ambuja Cement.

- Blending: Different categories of materials are being blended to get the waste mix best suited to Cement Kilns. Industry normally blends biomass with plastic waste / RDF. TDI tar and spent Carbon are blended to their coal.
- Segregation: All the materials, irrespective of their categories are segregated for acceptable size and foreign material inside i.e. Stones, Steel pieces, over size material etc. Any material beyond 75 mm and 150 mm are segregated.
- Shredding: Industry is operating shredders for shredding of biomass to required size. Industry generally shredding the biomass below 75 mm size and 150 mm
- Drying: The wastes received are being co-processed at first in first out basis. The stored waste like plastic waste, RDF and biomass are exposed to atmosphere for sun drying / natural ventilation for reducing the moisture content.

Covered Storage Area

Leach proof Geometric membrane



Separate Entry & Exit Way System

Proper Fire Hydrant System

Display of SOPs (local Language) in Storage Yard

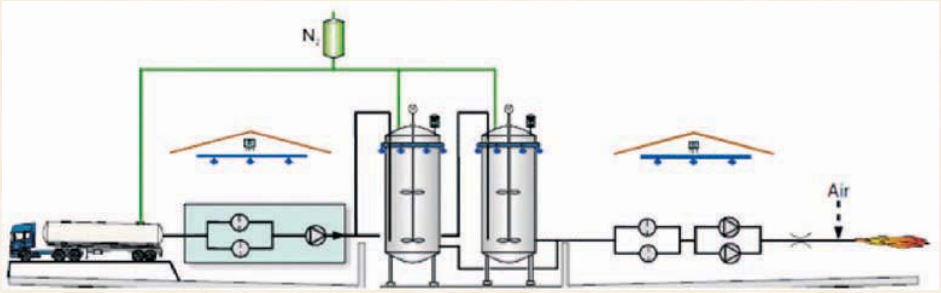
Feeding Systems for Solid Waste

Feeding system i.e. hopper starts from inside the storage yard hence no internal transportation is required. Material is feed into the hopper by winch system and transported through closed chain conveyor system for feeding of the solid waste at Calciner.

Feeding System inside Storage Area

Properly Closed Chain Conveyor System

System for Co-processing Liquid waste



- The waste mix liquid is received in closed body tankers from waste generators or from TSDF (Treatment, Storage & Disposal Facility). It is connected with unloading pumps installed in the liquid AFR shed. The tanker is brought to standstill on the parking bay.
- The tanker is then connected with earthing to ensure proper grounding. After fixing wheel chokes, a sample of liquid is drawn and tested in AFR lab for parameters viz. Compatibility, %Water, %Chloride, %Sulfur, pH, and Calorific value. Once the parameters are within limits, the liquid is pumped into settling tank (capacity 40 KL) having the screens to remove any coarse solids/sediments. The liquid from settler is pumped in to storage tank with the help of centrifugal type unloading pumps and filtered through Basket filters.
- There are two storage tanks (2 x 250 KL capacity). The storage tank farm is provided with retention safety basin, spark arresters, level sensors and other safety devices. The storage tanks are equipped with mechanical agitators (propeller type mixers) to homogenize the liquid. Finally, the homogenized liquid is fed from storage tank to plant. In order to ensure accurate dosing of liquid with variable density and viscosity to make Positive displacement of pumps, variable frequency drives are installed. The pump can feed the liquid at 3 TPH. The liquid passes through the Coriolis flow meter measuring the liquid flow by Coriolis force between moving mass and perpendicular oscillating tube.

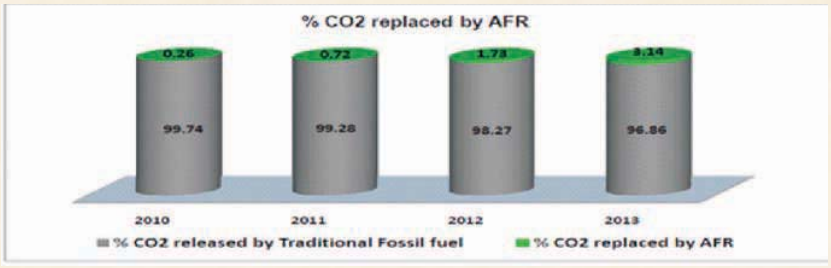
The quantity/flow of liquid are controlled from central control room. The liquid is fed into pre-heater through twin fluid atomization nozzle where the liquid is atomized by compressed air into very fine droplets ensuring complete combustion of liquid in the pre-heater.

Benefits

Economical

Sr. no	Fuel	Fuel consumption before CP	Fuel consumption after CP
1.	Electricity, KWH/ tonne of Product	92.71	88.21
2.	Furnace oil. Liter / tonne of product	-	-
3.	Coal/lignite, Kg/ tonne of product	110.69	96.34
4.	Natural gas, Sm3/ tonne of product		
5.	LDO, Liter / tonne of product	0.10	0.50

Environmental



(1) Substitution of fast depleting limited natural resources of limestone 25 – 30%.
(2) Conservation of fossil fuels like Coal, Oil & Gas etc can be achieved due to the substitution of clinker with fly ash be achieved.
(3) 15 – 20% Electrical energy savings which will reduce further conserve fossil fuels due to avoidance of electricity generation.
(4) CO_2 reduction (direct): 220 – 280 kg CO_2 /t PPC (for Cement with 27 - 35% by mass fly ash).
(5) CO_2 reduction (indirect): 1 kWh in specific power consumption reduces CO_2 emissions by 1 kg hence reduction in CO_2 emissions is expected to be 13 – 17 kg / t PPC (for Cement with 27 - 35% by mass fly ash).
(6) Possibility of releasing vast space occupied by wet fly ash ponds.
(7) Avoidance of ground water contamination due to open storage of fly ash.
(8) Environment friendly disposal of fly ash and creating economic value while conserving the fast depleting natural resources (coal, limestone).